

**National Aeronautics and
Space Administration**

June 30, 2004

NN-H-04-Z-YO-006-N

RESEARCH ANNOUNCEMENT

**INSPIRING THE NEXT GENERATION OF EARTH EXPLORERS:
INTEGRATED SOLUTIONS FOR K-16 AND INFORMAL EDUCATION**

Notice of Intent due July 29, 2004

Proposals due September 28, 2004

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)
HEADQUARTERS
OFFICE OF EARTH SCIENCE
300 E STREET SW
WASHINGTON, DC 20546-0001**

**INSPIRING THE NEXT GENERATION OF EARTH EXPLORERS:
INTEGRATED SOLUTIONS FOR K-16 AND INFORMAL EDUCATION**

NASA RESEARCH ANNOUNCEMENT (NRA)

NN-H-04-Z-YO-006-N

CATALOG OF FEDERAL DOMESTIC ASSISTANCE (CFDA) NUMBER: XX.XXX

ISSUED: June 30, 2004

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Inspiring the Next Generation of Earth Explorers: Integrated Solutions for K-16 and Informal Education

I. FUNDING OPPORTUNITY DESCRIPTION

a. Purpose of this NASA Research Announcement

The purpose of this NASA Research Announcement (NRA) is to solicit innovative solutions that systematically increase usability of NASA Earth Science knowledge and data resources in science, technology, engineering, and mathematics (STEM) education. This NRA specifically seeks proposals utilizing digital information infrastructures and extensive education networks to serve broad and diverse audiences. Emphasis is placed on expanding impact, particularly among underrepresented, underserved, and disadvantaged populations. Proposals are invited in the following areas:

- **Increasing K-12 Educator Support for Teaching Earth Science and Geography**
- **Strengthening Undergraduate Institutional Capacity in Earth System Science and Applications**
- **Enriching Public Scientific Literacy about the Earth System and the Environment**

This NRA solicits proposals for small awards for periods up to 12 months, as well as awards with a nominal period of performance of three years. This is a joint solicitation by the Earth Explorers Program (~\$2M/year) of the Earth Science Enterprise (ESE) and the Minority University Research and Education Program (MUREP, ~\$3M/year) of the Education Enterprise (EE). Of the \$5M/year to be available for this NRA, an approximate balance will be made between small awards for periods up to 12 months and larger awards with a nominal period of performance of three years. This opportunity is expected to be re-issued every 18 months.

b. NASA Education Enterprise and Earth Science Enterprise

The NASA vision -

*To improve life here,
To extend life to there,
To find life beyond.*

The NASA mission -

*To understand and protect our home planet,
To explore the Universe and search for life,
To inspire the next generation of explorers
...as only NASA can.*

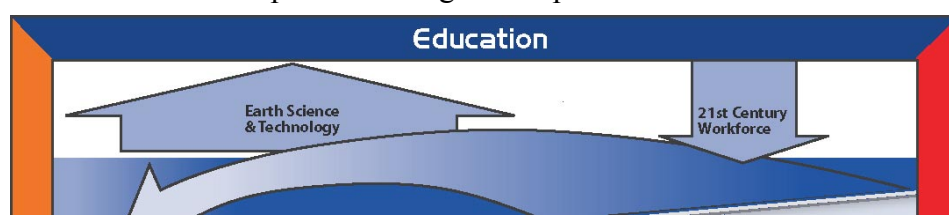
The Education Enterprise has the leadership in fulfilling NASA's mission to inspire the next generation of explorers...as only NASA can. With its ability to capture the imagination of educators, students, and the general public, NASA has a unique capacity to help revitalize science, technology, engineering, and mathematics (STEM) education in America. This will contribute to the continued availability of trained scientists, technologists, engineers, and educators to meet our Nation's technical workforce needs in the 21st century. The Education Enterprise has established Agencywide operating principles by which every NASA-sponsored education program or activity is developed, implemented, and evaluated. These six principles— customer focus, content, pipeline, diversity, evaluation, and

partnerships/sustainability—will be used to evaluate proposals submitted through this NRA and are described in more detail in Chapter V.

The Earth Science Enterprise fulfills NASA's mission *to understand and protect our home planet* by using the view from space to study the Earth system and improve prediction of Earth system change. The ability to understand, characterize, and predict the interactions between the continents, oceans, atmosphere, life, and ice directly bears on our quality of life, the national economy, and the overall health of the planet. With over one-third of the U.S. economy influenced by climate, weather, and natural hazards, the ESE creates the technologies and scientific knowledge that our partners in government and industry and the public use to enhance economic security and increase environmental stewardship. The advances in modeling complex Earth system phenomena, processing and distributing large volumes and varieties of data, and developing sophisticated Earth-observing instrumentation and observing systems have cultivated a systems approach that ESE utilizes in exploring the Earth as a planet. The systems approach to exploration, along with the expertise and experiences that ESE gained in the transition from the data-poor days of more than a decade ago to the present data-rich era, will lend direct support to NASA's mission to explore the universe and search for life. Finally, ESE plays an essential role in the Nation's need for a highly qualified workforce with the competencies to understand and mitigate the effects of climate change, reduce our vulnerability to natural and technological disasters, enhance homeland and national security, stimulate our economy through technological innovation, and protect our environment. The Earth Science Enterprise and the Education Enterprise work hand in hand to foster systems thinking throughout the education pipeline, fulfilling NASA's mission to inspire the next generation of explorers.

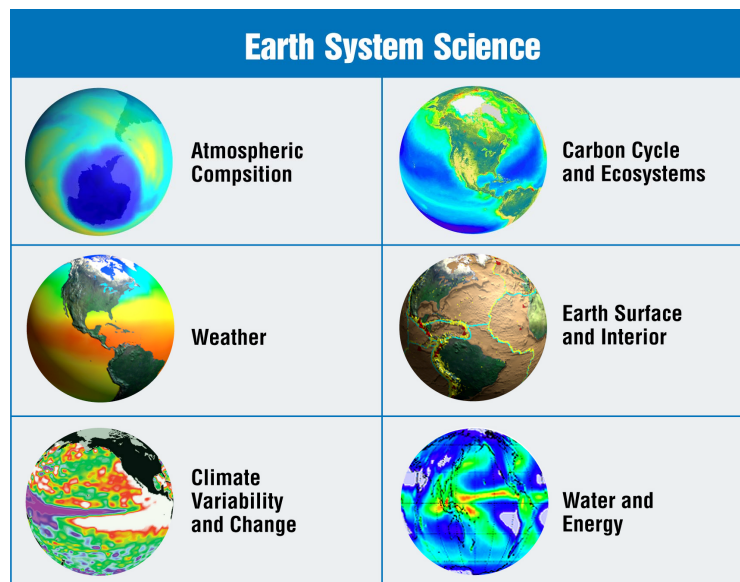
The ESE planning and implementation (see figure 1) framework consists of four elements, Research, Applications, Technology and Education. The driving force of the Enterprise is the search for answers to fundamental questions about the Earth system. These questions are defined by the broad research community and guide the development of ESE Earth-observing systems. The resulting observations and their subsequent analyses drive the models to produce predictions and forecasts that serve societal needs. The scientific and technological knowledge gained from exploration of our home planet and its application for socioeconomic benefit are used to develop stimulating and compelling content for STEM education. An important impact of this process is the development of a competent and highly qualified science and technology workforce to pursue the next generation of research questions, develop new technologies, design new decision support tools, and enhance STEM education for Earth and space exploration.

Figure 1. Earth Science Enterprise Planning and Implementation framework.



The Earth system science concept pioneered by NASA has changed the way our research is conducted, transitioning from a compartmentalized to interconnected view of Earth. The ESE aims to acquire a deeper scientific understanding of the major components of the Earth system, their interactions, and the consequences of changes for life on Earth. Models of Earth system processes are linked together, increasing predictive skill of climate, weather and natural hazards. Research activities are organized into six essential focus areas: atmospheric composition; carbon cycle and ecosystems; weather; Earth surface and interior; climate variability and change; and water and energy cycles (see figure 2).

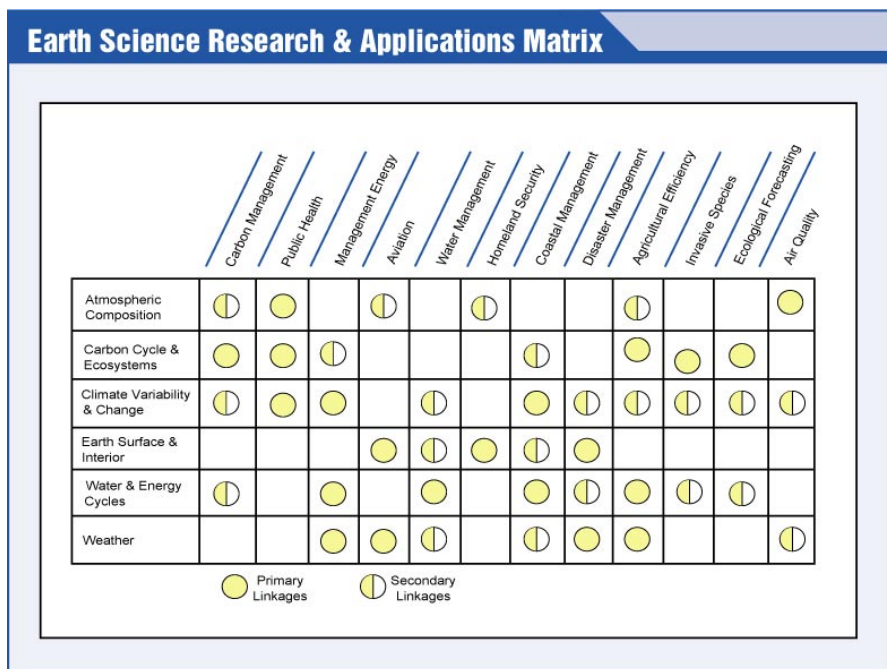
Figure 2. Six focus areas of NASA's Earth system science research investments.



In Earth science applications, the ESE expands and accelerates the realization of economic and societal benefits from NASA research and development in Earth science, information, and technology. The approach is to enable the assimilation of outputs from Earth system science models and remote sensing missions as inputs to decision support systems for service

to society. The outcomes are manifest in enhanced decision support, and the impacts are projected to result in significant socioeconomic benefits for Earth science applications of national priority: energy management, aviation, disaster management, invasive species, agricultural efficiency, homeland security, public health, water management, carbon management, ecological forecasting, coastal management, and air quality. These twelve applications draw from research in the six science focus areas as shown in figure 3.

Figure 3. Earth Science Research and Applications Matrix.



At the nexus of the Earth Science Enterprise and the Education Enterprise, the Earth Science Education Program captures and communicates the excitement of ESE activities in Earth system research and applications to inspire the next generation of Earth explorers. Program activities promote student achievement in STEM and help prepare a new generation of Americans to pursue challenging careers in Earth and space exploration and teaching. The ESE Education Program also supports public scientific literacy by cultivating citizens' abilities to access Earth system data, resources, and information, enabling individuals to satisfy their own need for understanding how the Earth works.

The evolution of Earth system science over the past 15 years has required researchers to extend beyond their individual areas of expertise, collaborate with scientists in other disciplines and sub-disciplines, and approach investigations from an interdisciplinary perspective. Similarly, the initiation of academic programs in Earth system science requires collaborations among faculty and institutions representing a breadth of interests and depth of disciplines in relevant fields. The effort required in this undertaking is substantial enough that many technical colleges, community colleges and minority serving institutions have not yet become an integral part of the community. Consequently, ESE knowledge and learning resources have not broadly reached these institutions. NASA recognizes the important role these institutions play in the education pipeline. While some students at these institutions will choose to pursue advanced degrees and research career paths in Earth or geosciences, others will constitute a substantial proportion of the future workforce in Earth science applications

for our Nation's scientific, security and economic interests¹. As the workforce becomes increasingly diverse, it is particularly crucial to enhance the exposure of students from underrepresented and underserved groups to Earth system science career paths and/or strengthen their preparation for employment in Earth science applications that are inherently multi- and interdisciplinary.

The development of academic programs in Earth system science at elementary, middle, and high schools is limited by the shortage of teachers with the background needed to bring an interdisciplinary Earth system perspective into the classroom. The collaboration between the Earth Science and Education Enterprises in this joint NRA represents NASA's intent to strengthen academic capabilities and student preparation in Earth system science among 2-/4-year colleges and minority serving institutions and to improve elementary and secondary teacher qualifications in Earth system science.

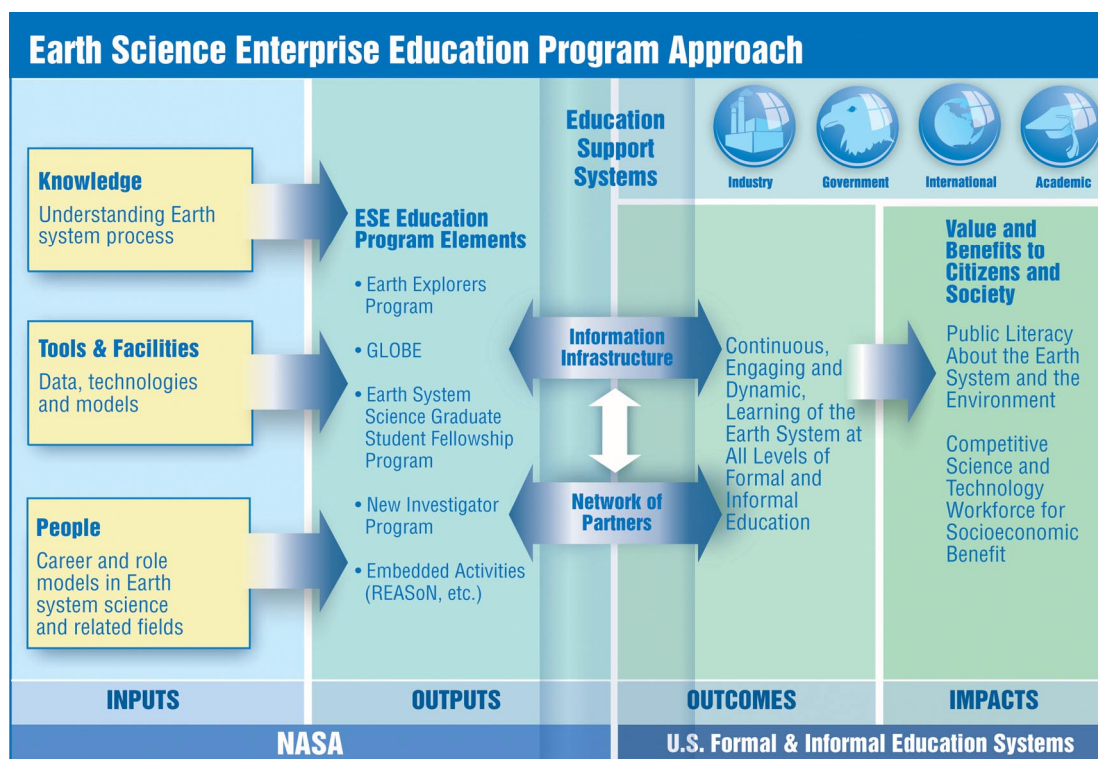
Prospective proposers are strongly encouraged to obtain a thorough understanding of the *Earth Science Education Plan* (<http://www.earth.nasa.gov/education>), along with its parent documents, the *Earth Science Enterprise Strategy* (<http://www.earth.nasa.gov/visions>) and the *Education Enterprise Strategy* (<http://education.nasa.gov/about/strategy>). A synopsis of current and planned ESE missions, along with the geophysical parameters, Earth system models and model predictions associated with them may be found on the NASA ESE system components website (<http://www.esa.ssc.nasa.gov/m2m>). Proposals that do not explicitly demonstrate a linkage to Earth system research and applications content and/or data resources from Earth observing satellites as described in the *Earth Science Enterprise Strategy* will be considered non-responsive and may be returned without further review.

c. Importance of Education Support Systems to this NRA

Depicted in figure 4 is the approach taken by the ESE Education Program to maximize the outcomes and impacts of program activities for national benefit, particularly among underrepresented, underserved and disadvantaged groups. This approach emphasizes "education support systems" as encapsulated by the use of digital information infrastructures and extensive partnership networks for the systematic delivery of ESE resources to formal and informal education communities.

¹ Preparing Students for Careers in Remote Sensing Applications, 2002.
<http://www.waspacegrant.org/remsenwkshp.html>

Figure 4. ESE Education Program approach.



Information infrastructures provide ready access to ESE resources via software, data interfaces, and other tools or technologies that are interoperable and shared by all members of the learning community. The ESE participates in ongoing national efforts focused on the systematic development and application of hardware and software for research and education. Activities include collaboration with the National Science Foundation (NSF) on the Digital Library for Earth System Education (DLESE; <http://www.dlese.org>), an emerging resource for sharing learning materials among the community of scientists, teachers and students. NASA's ESE Reviewed Collection (<http://earth.nasa.gov/education/esereview>), which provides access to high-quality education resources for formal and informal education, is searchable through DLESE. The ESE participates in Geospatial OneStop (<http://www.geodata.gov>) to coordinate geospatial information principles and practices (interoperability, metadata, standards, etc.), and the NSF-led planning and development activities for cyberinfrastructure, a revolutionary approach for strengthening science, engineering and education. Efforts are underway to ensure that any new data access and visualization software that may be developed through ESE sponsorship meet Open GIS Consortium (OGC) Web Services specifications.

GLOBE (<http://www.globe.gov>), REASoN², and other ESE Education Program elements (see figure 4) constitute a large integrated network of partnerships. GLOBE, an international science and education program for teachers and students has initiated statewide adoption in North Carolina and Texas and is committed to using this experience to enhance its service to other partners. Mission Geography (<http://missiongeography.org/>), in collaboration with several professional societies, and EarthKam (<http://www.earthkam.ucsd.edu/>) promote *Geography for Life: The National Geography Standards* and spatial thinking at the

² Research, Education, and Applications Solutions Network

elementary and secondary levels. As students enter colleges and universities, they continue to advance their scientific understanding of the Earth system and develop core competencies and skills in geospatial information technologies through Earth System Science Education for the 21st Century (ESSE 21; <http://esse21.usra.edu>). Since its inception in 1991, ESSE 21 has sponsored faculty from 63 colleges and universities in the collaborative development of over a hundred Earth system science courses. Minority undergraduate students receive mentoring and professional development through Minorities Striving and Pursuing Higher Degrees of Success in Earth System Science (MS PHD's; <http://msphds.usf.edu>), developed in partnership with the National Science Foundation, the American Geophysical Union, the American Meteorological Society, the Ecological Society of America, and others. Earth System Science Education Alliance (ESSEA; <http://www.cet.edu/essea>) offers online Earth system science courses for pre- and in-service teachers through a network of 20 participating institutions of higher education. The Earth System Science Fellows and New Investigators in Earth Science have begun to form a network to continue to advance Earth system science and Earth science applications.

Earth Science Research, Education, and Applications Solutions Network (REASoN) is a distributed network of data and information providers, exemplifying the ESE approach to education. REASoN unites activities under a unified management approach, taking full advantage of public and private resources and partnerships to derive maximum benefit for the public good. With projects for elementary and secondary, higher, and informal education, REASoN addresses community needs with respect to timely and ready access to Earth and environmental data. REASoN and a sampling of other successful programs are highlighted in the *Earth Science Education Plan* (<http://earth.nasa.gov/education>).

NASA seeks to extend the accomplishments of existing program elements to achieve broader impact by forging links and partnerships among existing networks; expanding interactions among 2-/4-year colleges, minority serving institutions, and research institutions; increasing access to network resources; and integrating network resources with teacher education programs, certification programs, degree programs and other educational programs having a strong impact on learning.

NASA places a premium on networked partnerships and integrated resources as essential means to make systemic and sustainable contribution to improving the Nation's STEM education. As discussed in the next section, all proposals should include evidence or demonstrate meaningful partnerships and/or collaboration. Proposals pertaining to a single institution or a single element in the education system and/or geographic location will not be supported under this NRA.

d. Description of this Opportunity

Descriptions of three categories of opportunity are provided below, which is followed by the award information in Chapter II and eligibility requirements in Chapter III.

i. Increasing K-12 Educator Support for Teaching Earth Science and Geography

Climate change, management of Earth's natural resources, and other challenging Earth system change issues face our generation and our children's generations as we enter the 21st century. Mitigating negative effects of Earth system change requires both a science and technology workforce qualified to approach these issues from an interdisciplinary Earth system perspective and an educated citizenry with the scientific background needed to make

informed decisions about lifestyle choices and policy issues. The elementary and secondary grades are pivotal for preparing students for interdisciplinary STEM careers and responsible participation in policy decisions that affect our quality of life, the national economy and the overall health of the planet. Student interest in STEM not sparked in the earlier grades is often lost by high school. At the same time, approximately 40 percent of our nation's Earth science teachers are teaching without a major, minor, or certification in the field and approximately 80 percent are teaching without both a major and certification in the field³. The ESE recognizes the positive consequences of teacher content knowledge in student performance, and is dedicated to increasing teacher qualification and expanding the integration of Earth system science into core STEM disciplines, including the notion of Earth as a planet and a laboratory for space exploration.

With advances in computing technologies and the increasing availability of geospatial data, spatial thinking will play a significant role in the information-based economy of the 21st century. Spatial thinking—a constructive amalgam of concepts of space, tools of representation, and processes of reasoning—uses space to structure problems, find answers, and express solutions. It is powerful and pervasive in everyday life, the workplace, and science. However, there is much concern that spatial thinking is not systematically infused across elementary and secondary curriculum, and that competence in spatial thinking is presumed, not instructed⁴. NASA recognizes that the abundant resources from the Earth Science Enterprise can make an important contribution to address this challenge through various forms of support to educators.

Proposals for large awards (see Chapter II) for a period of performance of up to three years should aim to improve teacher qualification in Earth system science, increase effective use of existing ESE and other NASA resources, enhance educator knowledge of the inherent links between Earth system science and STEM education, establish pathways for integrating Earth system science content into STEM education, and/or facilitate and streamline access to and analysis of Earth observing data. Proposed projects are expected to have a positive impact on student attitude toward and achievement in STEM, with the long-term goal of motivating students to pursue STEM as they progress through the academic pipeline. Proposed projects must be undertaken in partnership with suitable outside organizations, including appropriate jurisdictions at the school district or state level, cross-departmental or -institutional collaboration, professional societies, or other appropriate science and education partners. State and national level alliances are encouraged to leverage program impact, to promote alignment with STEM priorities, and to promote systemic change. All activities should be replicable, of consistent high quality, and sustainable.

Proposals for small awards (see Chapter II) for a period of performance of up to 12 months are also encouraged. Proposals for small awards may be more appropriate than proposals for larger awards in cases where a proof of concept is desirable, an unforeseen or new opportunity exists for extending a previous project that would significantly increase the impact, or significant time and effort is needed for strategic development of alliances and/or

³ Qualifications of the Public School Teacher Workforce: Prevalence of Out-of-Field Teaching 1987–88 to 1999–2000, National Center for Education Statistics, available http://nces.ed.gov/pubs2003/quarterly/fall/2_2.asp

⁴ National Research Council (NRC). Late June 2004. Learning to Think Spatially. National Academy Press, Washington, DC.

partnerships that would align with the missions of individual institutions and NASA. A clear outcome must be identified in such proposals.

ii. Strengthening Undergraduate Institutional Capacity in Earth System Science and Applications

The objective of this category of opportunity is two-fold. Through enhanced capabilities at 2-/4-year colleges and minority serving institutions and increased proficiency in up-to-date Earth system research from space, NASA seeks to encourage underrepresented minority students in STEM to consider academic and/or research careers in geosciences, and/or joining the workforce of expanding Earth science applications.

It has long been recognized that the Earth and space scientific community does not reflect the diversity of the Nation⁵. From 1980-2000, less than 200 minorities (< 4%) received doctoral degrees from geoscience departments at US institutions; for the same period, underrepresented minorities received less than 6% and 4% of all geoscience bachelor's degrees and master's degrees conferred, respectively⁶. A significant increase in the number of geoscience bachelor's degrees awarded to underrepresented minorities would seemingly produce a substantial increase in the number of advanced geosciences degrees awarded to underrepresented minorities; the program mentioned earlier, Minorities Striving and Pursuing Higher Degrees of Success in Earth System Science (<http://msphds.usf.edu>), is specifically designed to provide mentoring and professional development to these individuals to promote retention and advancement. Those who choose not to pursue academic and/or research careers will likely fill positions created by the technical advances in satellite remote sensing and expanding Earth science applications in public (federal/state/local government) and private sectors.

In many small colleges and minority serving institutions, both students and faculty may work in relative isolation and not have ready access to the types of multi-/interdisciplinary and institutional support systems readily available at other institutions, particularly those supported by NASA, conducting cutting edge Earth system research and applications. Unfortunately, such research institutions are also generally unfamiliar with the capabilities of the students and faculty at these institutions—a situation that can unintentionally limit opportunities for both parties, and thus the advancement of diversity in the Earth or geoscience profession.

Proposals in this category may focus on the development or enhancement of academic programs in Earth system science and related fields and/or the establishment or enrichment of institutional partnerships that would enhance student learning, increase exposure to career opportunities and advance diversity in the profession. Possibilities include new or revised courses, new degree programs, seminars, student problem-solving through enhanced use of NASA resources (data, models, tools, etc.), faculty or student exchange between partnered campuses, articulation of 3/2 or joint degree programs, etc.

While stand-alone faculty research projects are not the focus of this solicitation, to the extent that faculty professional development and student research are central to quality

⁵ American Geophysical Union (AGU) Diversity Plan. 2002.

http://www.agu.org/sci_soc/education/diversity.html

⁶ American Geological Institute. 2001. Geoscience Doctorate Degrees Granted, 1980-2000, <http://www.agiweb.org/career/phddeg.html> (Figures 1-3, Tables 2-4)

undergraduate education, innovative proposals that would enhance the research capabilities available to faculty and students at minority institutions (e.g., collaborative research, access to expertise or facilities at a partner institution, etc.) will be considered.

NASA believes increased diversity must be accomplished through meaningful and sustained partnerships or alliances across a range of institutions of higher education, including the universities receiving substantial support from the Earth Science. NASA encourages such partnerships. Proposals that do not include such a partnership will not be considered. The program staff in the Office of Earth Science and Office of Education will help establish linkages between minority institutions and current participants in the Earth system research and applications community; however, the ultimate responsibility for successfully establishing partnerships or alliances rests with the proposers.

It is stated throughout this solicitation that ~\$3M/year is under the auspices of NASA Minority University Research and Education Program (MUREP). Proposals to be considered for these funds must be led by eligible minority serving institutions (see Chapter III); up to 25% of the awarded funds may be spent at partner institutions to facilitate the collaboration. The nature of the partnership must be articulated and demonstrated through letters of commitment at appropriate levels of authority of the partnering institutions. Although it is anticipated that a large portion of the MUREP funds will be considered for strengthening institutional capabilities related to Earth system science, proposals from minority serving institutions to improve educator support and public scientific literacy (see subsections i and iii) will also be considered.

To sustain new initiatives in academic programs and meaningful institutional partnerships, significant effort is generally required to align with the institutional mission and long-term vision. Institutions interested in proposing are encouraged to consider the opportunity for small awards (see Chapter II) if insufficient planning has been accomplished or integrated at the institutional level. Proposals for small awards must articulate a clear outcome.

To the degree applicable, prospective proposers are encouraged to incorporate lessons learned and better practices from NASA Minority University and College Education and Research Partnership Initiative in Space Science (2000 and 2003).

iii. Enriching Public Scientific Literacy about the Earth System and the Environment

The public is increasingly called upon to consider Earth system knowledge when participating in policy decisions that impact our quality of life, the national economy, and the overall health of the planet. Informal learning differs from formal and non-formal learning in that it is self-directed and not managed by any other person. Informal learning can occur anywhere at any time in people of all ages. It is voluntary, hands-on, assessed only by the individual, and highly learner directed. It is an important component of lifelong learning, which many argue is a requisite in our highly technical, fast-paced modern world.

Informal Science Education (ISE) promotes informal learning and provides stimulating experiences for STEM learning through media, exhibits, and community-based programming. ISE provides resources for informal learners that satisfy personal curiosity about the world and potentially spark a young person's first interest in a career in science, thereby serving to recruit entrants into the beginning of the pipeline. The hands-on, learner-directed nature of learning in informal education settings can be more effective than the formal education environment for some individuals. For these reasons, it is highly desirable to expand informal science activities to reach the broadest possible audience.

This solicitation seeks to expand program impact to the broader public sector through learning venues capable of large impact and to audiences not currently served by informal science centers. Efforts encouraged by this NRA include media programming (radio, television, film, video), print (newspapers, trade journals, magazines, books), and community or civic groups (after school programs, youth groups, etc). Emphasis is placed on engaging new audiences and building new alliances between formal and informal educational activities. Support for activities relating to professional development of informal science educators and direct support of exhibits at museums, science centers and similar informal education institutions are addressed in the NASA Explorers Institutes Program and elsewhere within existing ESE Education activities and therefore are outside the scope of this solicitation.

II. AWARD INFORMATION

A total of \$5M/year is available for this NRA. Of this total, an approximate balance will be made between small awards for periods up to 12 months and larger awards with a nominal period of performance of three years. This opportunity is expected to be re-issued every 18 months.

Of the two levels of awards possible under this NRA, the small awards will be in the range of \$50-80K for a period of up to 12 months and the larger awards will be in the range of \$100-\$300K per year for a period of up to three years. The small awards may be for proof of concept, extension of a past program or project for wide replication or sustainability, facilitation of partnerships, etc. It is expected that proof-of-concept projects will be developed to the maturity needed to compete for other sources of funding. Proposals for larger, full development awards must demonstrate capacity for institutionalization and continued sustainability beyond the funding period; costs at the lower end of the range \$100-200K per year are encouraged.

Pending competitiveness of the proposals received, the allocation of funds among the three categories of opportunities described in Chapter I is expected to be 25-30% in K-12 educator

support, 55-65% for strengthening undergraduate capabilities, and 10-15% in informal education.

To be considered for the ~\$3M/year under the auspices of the Education Enterprise/Minority University Research and Education Program (MUREP), the proposal must be led by a principal investigator from eligible minority serving institutions (see Chapter III). However, up to 25% of the awarded funds may be spent at partner institutions to facilitate the collaboration.

Cost sharing is not required, but viewed favorably, in proposals submitted under this program announcement.

III. ELIGIBILITY INFORMATION

For consideration of the ~\$2M/year from the Earth Explorers Program of the Earth Science Enterprise, proposals must be submitted by U.S. institutions, which include academic institutions, museums, science centers, hospitals, other non-profit organizations, and state and local governments. Collaborations with partners from institutions other than the submitting institution, including international collaborations, are strongly encouraged. Access to unique equipment, facilities, and/or geographical locations, and the opportunity to collaborate with outstanding foreign researchers and educators may provide substantial benefits to the proposed activity; however, U.S. funds cannot be used to support participation of foreign partners.

For consideration of the ~\$3M/year from the Minority University Research and Education Program of the Education Enterprise, proposals must be submitted, inclusively, from U.S. colleges and universities designated by the US Department of Education as minority educational institutions. The list of the Department of Education designated minority institutions may be obtained through the World Wide Web URL at <http://www.ed.gov/about/offices/list/ocr/edlite-minorityinst.html>. All proposals must originate from one of the following: an accredited minority college or university referred to as an *Other Minority University (OMU)*, as defined in the Higher Education Act [See 20 USC 1135d and 34 CFR 637.4b]; a *Historically Black College or University (HBCU)* under Title III of the Higher Education Act of 1965 as amended [See 34 CFR 608.2]; a *Hispanic-Serving Institution (HSI)* under Title III of the Higher Education Act of 1965 as amended [See 20 USC 1059 ©]; Public Law 102-325, Section 306, July 22, 1992]; a *Tribal College or University (TCU)* cited in Section 532 of the Equity in Education Land Grant Status October 1994; Tribally Controlled Community College Assistance Act of 1978, or the Navajo Community College Assistance Act of 1978, Public Law 95-471.

One of the purposes of this joint solicitation between the Earth Science Enterprise and the Education Enterprise is to broaden institutional participation in NASA's Earth science activities and not to increase the funding at institutions that are already significant participants. Therefore, HBCU's, HSI's, TCU's, and OMU's that have received a total of \$1M or more of funding support from NASA relating to Earth science over the past three years are ineligible to participate as lead institutions for proposals to this NRA. This total does not include funds received under NASA Minority University Education and Research Division prior to its reorganization into the NASA Office of Education in February 2003. A portion (up to 25%) of the funds awarded to the lead minority institution may be spent at other institutions to support the development of academic and research partnerships and exchange programs

with such institutions. MUREP funds will not consider participation by non-U.S. organizations.

An individual may be a Principal Investigator or Co-Principal Investigator on only one proposal submitted in this competition.

The participation of an individual or individuals from a NASA Center or JPL in a proposal must be accompanied by the signatures of appropriate cognizant officials, including the signature of the respective Education Director.

IV. PROPOSAL AND SUBMISSION INFORMATION

a. Source of Application Materials

All information needed to apply to this solicitation is contained in this announcement and in the companion document entitled *NASA Guidebook for Proposers Responding to a NASA Research Announcement – 2004* (hereafter referred to as the *NASA Guidebook for Proposers*) located at <http://www.hq.nasa.gov/office/procurement/nraguidebook/>.

By reference, the 2004-edition of this NASA Guidebook for Proposers is incorporated into this NRA, and proposers are responsible for understanding and complying with its procedures for the preparation and submission of their proposals. Proposals that do not conform to its standards may be declared noncompliant and returned without review.

Note that both the introductory material and appendices of this *NASA Guidebook for Proposers* provide additional information about the entire NRA process, including NASA policies for the solicitation of proposals, guidelines for writing complete and effective proposals, and NASA's general policies and procedures for the review and selection of proposals, as well as for issuing and managing the awards to the institutions that submitted selected proposals. A group of *Frequently Asked Questions* (FAQs) provides additional miscellaneous information about a variety of the NASA proposal and award processes and procedures. The NASA policy for proposals involving non-U.S. participants is given in Section (I) of Appendix B of this *NASA Guidebook for Proposers*.

Comments and suggestions of any nature about this NASA Guidebook for Proposers are encouraged and welcome and may be directed at any time to Mr. Thomas Sauret, Office of Procurement, Code H, NASA Headquarters, Washington, DC 20546-0001; phone: (202) 358-1068.

b. Content and Form of the Application Submission

i. NASA Proposal Data System

This NRA requires that the proposer register key data concerning their intended submission with NASA's master proposal data base system located at the Web site <http://research.hq.nasa.gov>. Therefore, potential applicants are urged to access this site well in advance of the proposal due date(s) of interest (see below) and familiarize themselves with its structure. It is especially important to note that every individual named on the proposal's Cover Page (see below) must be registered in this NASA proposal data system and that such individuals must perform this registration themselves, i.e., no one may register a second party, even the Principal Investigator of a proposal in which that person is committed to participate. Note that the data entered into this data site are strictly for NASA's use only.

Requests for assistance in accessing and/or using this Web site may be directed by E-mail to proposals@hq.nasa.gov , or by telephone Monday through Friday, 8:00 AM – 6:00 PM Eastern Time at (202) 479-9376. Frequently Asked Questions (FAQs) may be accessed through the Proposal Online Help site at <http://proposals.hq.nasa.gov/help.html> .

ii. Notice of Intent to Propose

A Notice of Intent (NOI) to propose is encouraged but not required for the submission of proposals to this solicitation. The information contained in an NOI is used to help expedite the proposal review activities and, therefore, is of considerable value to NASA. NOIs must be submitted to NASA's master proposal data base located at <http://research.hq.nasa.gov> by July 29, 2004.

iii. Cover Page, Proposal Summary, and Budget Summary

All proposals submitted in response to this NRA must be prefaced with a required, contiguous proposal *Cover Page/Proposal Summary/Budget Summary* form that is accessed at <http://research.hq.nasa.gov> . This form may be accessed and submitted starting June 30, 2004 and remains open until midnight Eastern Time on September 28, 2004. After the requested data are electronically entered and submitted, the entirety of this form is to be printed and then signed by the designated personnel for submission with the required hard copies of the proposal. No other formal forms are required for proposal submission. See the *NASA Guidebook for Proposers*, Chapter 2, for further details.

Prospective proposers are advised that the *Cover Page* requires that all applicants must provide the Dun and Bradstreet (D&B) Data Universal Numbering System (DUNS) number for their employing organization. This requirement applies to successor awards as well as to prospective new awards. The DUNS number is a unique nine-character identification number provided by the commercial company Dun and Bradstreet (D&B). Applicants may call D&B at 1-866-705-5711 to register and obtain a DUNS number, or access the D&B Website at <http://www.dnb.com/us/> . Requesting a DUNS number takes ~10 minutes by telephone or ~14 days through the Web site; both are free of charge. Organizations will use the same DUNS number with every proposal submitted for a Federal grant or cooperative agreement so that this registration need only be done one time. Note that the DUNS number is site-specific. The *Cover Page* also requires a Commercial And Government Entity (CAGE) code that the applicant's organization obtains by registering in the Central Contractor Registration (CCR) database. This requirement centralizes information about grant recipients and provides a central location for grant recipients to change organizational information. Information for registering in the CCR and online documents can be found at <http://www.ccr.gov> . Before registering, applicants and recipients should review the *Central Contractor Registration Handbook* that is also located at the same site. The process for obtaining a CAGE code is incorporated into the CCR registration. Additional Information on DUNS numbers, CAGE codes and CCR Information can be found in the question and answer section of the NASA Sponsored Research Web Site at <http://ec.msfc.nasa.gov/hq/library/srba/>.

iv. Proposal Form and Contents

Prospective proposers should respond to this announcement in accordance with the instructions given in Appendices A.1 and A.2. The following guidelines supercede those provided in Appendix A.1 Paragraph (c) Section (4) Project Description and Section (5) Management Approach:

(1) Project Description. The main body of the proposal shall be a detailed statement of the work to be undertaken and should include:

(1) Rationale – Define the educational need the proposed solution will meet, and how the proposed solution will uniquely contribute to NASA's priorities for its educational mission. Include discussion of relation to the present state of knowledge, relation to previous work done on the project, and related work in progress elsewhere.

(2) Goals - Define the proposed educational goals and objectives, and describe how they contribute to the vision of the ESE Education Program.

(3) Audience - Clearly define the target audience. Do primary and secondary audiences exist? What is known about the audience's learning or operating levels and styles? What does the audience know about the topic? What preconceptions might they have about the topic that might influence the learning or communication outcomes? Estimate the size of the target audience.

(4) Activity – Thoroughly describe the proposed solution. Describe how the project will be accomplished and the goals achieved. Include a timeline of the developmental period.

(5) Dissemination – Outline plan for disseminating results to the broader community. Include discussion of how project will be sustained beyond funding period. Proof-of-concept awards should include a plan for scaling up. Larger awards should include a plan for institutionalization.

(6) Evaluation – Describe how project success will be measured. Include interim benchmarks for measuring project performance. Provide meaningful estimates for measuring project *outcomes* (e.g. the numbers of people reached; audiences served) and *impacts* (e.g. impact on student learning/STEM competencies).

(7) Management Approach – Identify roles and responsibilities of personnel who will be involved in the development and production of the activity, including staff, advisors, and external partnerships where appropriate. Explain how management of the educational activities is configured in the overall mission project management. Provide staffing details for all elements of the education plan. Provide chronological timeline for project development, implementation, and evaluation. Identify main activities and include interim benchmarks.

(8) Prior Support – Demonstrate effectiveness of prior support in Earth system science education in terms of *outputs* and *impacts*. CDs or other materials illustrating results of prior work can be included as attachments.

(2) Length. Effort should be made to keep proposals as brief as possible, concentrating on substantive material. Proposals are not to exceed 20 single-spaced pages, including figures, tables and references. Cover pages, abstract, certifications, budget sheets, biographical sketches of key personnel, summary of facilities and equipment, and attachments (i.e., letters of support, results of prior work) are not included in this page limit. The type size must be clear and readily legible, in standard font of at least 12 points. Font size smaller than 12 points will not be accepted. Margins are to be at least 1 inch along all sides.

c. Proposal Submission Dates, Time and Location

The signed original proposal plus 20 printed copies must be physically received by 4:30 PM Eastern time on September 28, 2004. The address for the delivery of proposals is:

Office of Earth Science
NASA Peer Review Services
Suite 200
500 E Street, SW
Washington, DC 20024

Telephone: (202) 479-9030

Submission deadline and timing: by 4:30 p.m., September 28, 2004

Selecting Officials:

Ronald J. Birk
Director, Applications Division
NASA Office of Earth Science
Code YO
300 E St. SW
Washington, DC 20546-0001
Phone: 202-358-2287
ronald.j.birk@hq.nasa.gov

Brad Weiner
Director, Higher Education Division
NASA Office of Education
Code NH
300 E St. SW
Washington, DC 20546-0001
Phone: 202-358-1089
bweiner@hq.nasa.gov

Announcement of selections: February, 2005

Because of the level of competition expected in response to this NRA it is unlikely that late proposals will meet the standards for review as stated in Appendix A.1 Paragraph (g).

d. Proposal Funding Restrictions

The construction of facilities is not an allowed activity unless specifically stated so in the program description. For further information on the allowability of costs, refer to the cost principles cited in Section 1260.127 of the NASA Grant and Cooperative Agreement Regulations (found in Title 14 of the Code of Federal Regulations, Part 1260; hereafter referred to as Handbook).

Travel, including foreign travel, is allowed as may be necessary for the meaningful completion of the proposed investigation, as well as for publicizing its results at an appropriate professional meeting.

U.S. research award recipients may directly purchase supplies and/or services that do not constitute research from non-U.S. sources, but award funds may not be used to fund research carried out by non-U.S. organizations. However, subject to possible export control restrictions, foreign nationals may conduct research while employed by a U.S. organization.

As provided by Sect. 1260.4(b)(2) of the NASA Grant and Cooperative Agreement Regulations, NASA does not allow for the payment of profit or fee to commercial firms under grant awards. Also, when a commercial firm is expected to receive compensating commercial benefits derived from performance of the proposed project, cost-sharing is mandatory. See Sect. 1274.204(b) of the regulations for more information on cost-sharing. Commercial organizations proposing under this NRA must address cost-sharing or explain why cost-sharing is not applicable.

Regardless of whether functioning as a team lead or as a team member, personnel from NASA Centers must propose budgets based on Full Cost Accounting (FCA). Non-NASA U.S. Government organizations should propose based on FCA unless no such standards are in

effect; in that case such proposers should follow the Managerial Cost Accounting Standards for the Federal Government as recommended by the Federal Accounting Standards Advisory Board (for further information, see <http://www.hq.nasa.gov/fullcost/>)

V. PROPOSAL REVIEW INFORMATION

a. Evaluation Criteria

The general criteria for proposal selection identified in Appendix A.1 Section (i), Evaluation Factors, apply to this announcement with the following clarifications. The principle elements (of approximately equal weight) for proposal evaluation are the proposal's intrinsic merit, its relevance to NASA and ESE educational objectives, and its cost:

i. Intrinsic Merit

(1) Quality and Feasibility— Proposal has clear goals and objectives that are aligned with the goals and objectives in the Earth Science Education Plan and the Education Enterprise Strategy; contain activities that directly contribute to meeting those goals and objectives; are clearly organized and have clear lines of management responsibilities; are consistent with the budget; and demonstrate a high probability for successful implementation or provide substantive evidence for actual successful accomplishments.

Alignment Indicators include:

- Program objectives are clearly and succinctly described and are clearly aligned with and support Earth Science Education goals and objectives and Education Enterprise goals and objectives. Program activities clearly flow from and directly contribute to achieving the goals and objectives.
- Essential information is provided about each proposed activity to be accomplished (e.g., who, what, when, where, why, how).
- Program implementation is feasible for the specified intended audiences.
- The Program management is clearly defined with clear lines of authority. Areas of responsibility are defined and specified. All key personnel are identified and have institutional authorization to participate. The Team has demonstrated that it has the qualifications and experience required to carry out the program.
- There is a schedule and/or timeline for proposed education activities or some indication of how education activities are or will be phased with the appropriate mission or program milestones. Proposals, Plans, or Summaries show how the phasing of such activities is clearly aligned to the budget .

(2) Customer Focus—Program has been designed to respond to a need identified by the education community, a customer, or a customer group.

Alignment Indicators are:

- The program is based on a compelling mutual need.
- NASA can make an effective content contribution.

- Participants will find the program valuable.
- The program is accessible to its intended audience.

(3) Partnerships/Leverage/Sustainability—Programs achieve high leverage and/or sustainability through intrinsic design or the involvement of appropriate local, regional, and/or national partners in their design, development, and dissemination

Indicators of committed, qualified and capable partnerships include:

- The program identifies partners and clearly defines the terms of the partnership and the nature of the collaboration.
- There are well-defined roles and specific tasks that are substantively related to the design, development, dissemination, implementation, or evaluation of education activities for each of the partners, and these roles and tasks are suitable/sufficient to ensure successful program implementation.
- Evidence is provided that partners are actually committed to carrying out the program; letters of partnership intent, specific support, or other evidence of the reality of the partnership are attached to the proposal and are explicitly discussed in the project description.

Indicators for High Leverage and/or Sustainability include:

- The education program can expand its scope (achieve higher leverage) by having an impact beyond the direct beneficiaries, reaching relatively large audiences, being suitable for broad dissemination, or drawing on resources beyond those directly requested in the proposal or plan, or the funds actually being provided in the case of an ongoing program.
- The program (or key aspects of it) is replicable in other educational institutions or settings.
- The program is sustainable beyond initial NASA funding by showing the potential for continuation beyond the period of direct NASA funding, adoption by the target audiences, and/or incorporation into institutional programmatic efforts.

(4) Evaluation— There is an appropriate evaluation plan in place to document outcomes and demonstrate progress toward achieving objectives of proposed activities.

Indicators of an appropriate evaluation plan include:

- The program is evaluated regularly by credible sources following professionally accepted standards for educational evaluations.
- There is evidence that the forms of evaluation are based upon reputable models and techniques appropriate to the content and scale of the program or are designed and

implemented by a reputable project partner who is knowledgeable in research and evaluation methods applicable to education efforts. Where appropriate, the evaluation plans/processes should include field-testing and modifications based on such testing before broad utilization.

- Evaluation methods provide useful information on the effectiveness and/or impact of the proposed program, and the program implements improvements based on evaluation evidence.
- The program collects, analyzes, and reports output and outcome data to a common NASA database to determine program reach, scope, and effectiveness and meet the requirements of program stakeholders.

ii. Relevance to NASA's Education Objectives

(1) Content—Programs make direct use of NASA content, people or facilities to involve educators, students, and/or the public in NASA science, technology, engineering, and mathematics.

Indicators of alignment include:

- The program is based on NASA's scientific and technical activities, reflecting "as only NASA can."
- The program ensures that the content is technically accurate.
- The program engages the public in shaping and sharing the experience of exploration and discovery.
- The program is aligned with recognized and endorsed education reform efforts.

With respect to alignment with endorsed education reform efforts, any proposed education activity (or product) that focuses on the formal education system must demonstrate a substantive and informed alignment with educational standards appropriate to the target audience and scale of the program. For example, national or regional (multi-state) programs in Earth or space science education should align with the National Research Council's *National Science Education Standards* and/or the American Association for the Advancement of *Science's Benchmarks for Science Literacy*, and/or the mathematics education standards provided by the National Council of Teachers of Mathematics, and/or *Technology Foundation Standards for All Students* published by the International Society for Technology in Education. Demonstration of alignment could be done by providing specific reference to at least one of the standards publications cited above, citing specific standards to be addressed, and, as appropriate, providing evidence of use of standards for professional development. Similarly, local (single state) programs may choose to align with national or appropriate state standards by providing the same level of documentation. Indicators of appropriate alignment with reform efforts might also include one or more of the following:

- Having descriptions of curricular products and/or educator training opportunities, for example, explicitly acknowledge alignment with education standards in one or more of the following educational fields: science (Earth and space science or physical science), mathematics, technology, or geography.
- Providing evidence that education partners engaged in developing and evaluating curricular products or educator training are knowledgeable about how to align activities (or products) with relevant education standards.
- Providing evidence of the existence of substantive links or partnerships that target urban areas, states, and/or regions where National Science Foundation systemic reform efforts have been implemented to increase the scope and impact of the proposed/planned/ongoing effort.

(2) Pipeline— Programs make a demonstrable contribution to attracting diverse populations to careers in science, technology, engineering, and mathematics (STEM).

Indicators include:

- The program promotes careers in STEM.

Approaches include teacher and student use of NASA ESE data, research experiences for students and teachers, exposure to career options through hands-on participation in STEM enrichment programs.

- The program promotes improvement of STEM skills.

Approaches include: engaging students in formal and informal educational settings in participatory activities, such as hands-on learning, research, the use of innovative technology, peer support groups, and mentoring relationships with professionals and college students; involving teachers in effective and extensive staff development opportunities to improve their content knowledge in STEM areas; increasing teacher participation in STEM enrichment programs; increasing parent awareness of and involvement in student programs in STEM subjects to strengthen family support of STEM education; directly involving families in activities in academic or non-academic settings designed to promote awareness of STEM subjects or STEM careers.

- The program creates linkages to other STEM educational opportunities both inside and outside of NASA.

Approaches include: directly coupling program participants to other NASA research, internship, scholarship, or fellowship programs; utilization of partnerships or having substantive linkages with the Math and Science Partnership Program (Department of Education/National Science Foundation) and/or Centers for Learning and Teaching (National Science Foundation) or coupling to STEM skill enhancement activities undertaken by community groups, corporations, research laboratories, museums, and educational/professional organizations.

- The program/product addresses diverse populations of students. The overall education program reflects an atmosphere of equity, balance, and inclusiveness

(3) Diversity—Programs reach identified targeted groups and contribute to the involvement, broad understanding, and/or training of underrepresented, underserved and/or underutilized groups in science and technology.

Engaging more minorities and women in careers and promoting greater interest in science and engineering within diverse communities has become an increasingly critical need in the United States.

Indicators that proposed/planned/ongoing programs reach and/or train underrepresented, underserved and/or underutilized groups may include one or more of the following:

- The program serves individuals from underrepresented groups and ensures accessibility to people with disabilities.
- The program has been or will be developed in close consultation with members of the communities it is intended to serve.
- The program promotes opportunities for faculty at minority serving institutions (Historically Black Colleges and Universities (HBCUs), Hispanic Serving Institutions (HSIs), Tribal Colleges and Universities (TCUs), and Other Minority Universities (OMUs)) to engage in research consistent with NASA's goals, objectives, and requirements.
- The program supports closing identified gaps in STEM proficiencies among diverse populations.
- The program provides awareness and understanding through culturally appropriate materials to targeted communities of how NASA's research and innovations affect and improve the quality of life for all citizens.

iii. Cost

(1) Resource Utilization—The adequacy, appropriateness, reasonableness, and realism of the proposed budget including demonstration of effective use of funds.

Indicators include:

- The proposed program outcomes justify total program costs.
- Proposers provide evidence that the scale of the proposed activity is commensurate with program funding. For example, a \$5.0 million per year education program is multifaceted and reaches an appropriately large and diverse audience (statewide, regional, or national scope) or provides an in-depth demonstration of a model program that is suitable for replication regionally or nationally; and a \$20,000 per year program is appropriately focused and does not propose unrealistic outcomes that are clearly beyond program resources.

- The overall program budget (including in-kind contributions and other funds leveraged from education partners' resources) is cost-effective. Overall project cost, costs of project deliverables, and the relationship of proposed budget to available funds are each realistic and reasonable.
- The proposal or program plan provides cited or estimated figures for the fiscal contribution of each partner, and those contributions are clearly commensurate with and support the activities to be undertaken by each partner in planning and implementing the program.

b. Review and Selection Process

Proposals will be evaluated by a combined mail and panel review. Contribution of resources, in-kind contributions, the leveraging of existing programs, products, and resources are encouraged. Awards will be made based on the availability of funds and the needs of the strategic program, as a whole. There is no pre-determined allocation of awards in terms of educational community reached. NASA reserves the right to make judgments during final project selection based on programmatic factors, including the overall balance of viable proposals across Earth system science education program as well as between smaller and larger awards.

c. Selection Announcement and Award Dates

NASA's stated goal is to announce selections within 150 days of the proposal due date. However, the Office of Earth Science does not usually announce new selections until the funds needed for awards are approved through the Federal budget process. Therefore, a delay in this process for NASA usually results in a delay of the selection date(s). After 150 days past the Proposal Due Date for which a proposal was submitted, proposers may contact the responsible Program Officer identified under Chapter VII.

Those proposers not selected will be notified by mail and offered a debriefing consistent with the policy in Section C.6 of the *NASA Guidebook for Proposers*.

VI. AWARD ADMINISTRATION INFORMATION

a. Notice of Award

NASA anticipates that only grants will be awarded under this NRA. Awards to educational institutions, nonprofit organizations, and commercial organizations in which there is no cost-sharing will be issued in accordance with Part 1260 of the NASA Grant and Cooperative Agreement Regulations; awards to commercial organizations in which there is cost-sharing will be issued in accordance with Part 1274 of the regulations.

Both the selected, as well as the nonselected proposers, will be notified consistent with the policy given in Section C.5.3 of the *NASA Guidebook for Proposers*. For selected proposers, the offeror's business office will be contacted by a NASA Awards Officer, who is the only official authorized to obligate the Government. Any costs incurred by the offer or in anticipation of an award will not be reimbursed.

b. Administrative and National Policy Requirements

This solicitation does not invoke any special administrative or National policy requirements, nor do the awards that will be made involve any special terms and conditions that differ from NASA's general terms and conditions as given in the Handbook.

c. Award Reporting Requirements

The reporting requirements for awards made through this NRA will be consistent with Exhibit G of Subpart A of the Handbook. Any additional requirements will be stated in the subsection entitled Programmatic Information that concludes each program in the Appendices.

VII. POINTS OF CONTACT FOR FURTHER INFORMATION

Inquiries about this NRA may be directed to:

Formal Education:

Diane Schweizer, Program Scientist
Earth Science Education
NASA Office of Earth Science
Code YO
300 E Street SW
Washington, DC 20546-0001
202-358-1582
diane.schweizer@nasa.gov

Minority Serving Institutions:

Carl Person, Manager
MUREP
Code NH
300 E Street SW
Washington, DC 20546-0001
202-358-2378
Carl.S.Person@nasa.gov

Informal Education:

Paula Coble, Program Scientist
Earth Science Education
NASA Office of Earth Science
Code YO
300 E Street SW
Washington, DC 20546-0001
202-358-1457
pcoble@hq.nasa.gov

General or Partnership-related:

Ming-Ying Wei, Lead/Manager
Earth Science Education
Code YO/NA
300 E Street SW
Washington, DC 20546-0001
202-358-0771
mwei@hq.nasa.gov

VIII. ANCILLARY INFORMATION

a. Commercially Available Data Sets

NASA's Earth Science Enterprise has adopted commercial data purchases as a mainstream way of acquiring research-quality data, as these commercial capabilities become available. NASA encourages the use of commercially available data sets by Principal Investigators as long as it meets the scientific requirements and is cost-effective. When responding to a NASA Research Announcement the proposer should identify the commercial data sources intended for use and the associated cost.

Your interest and cooperation in participating in this opportunity are appreciated.

Associate Administrator
Office of Earth Science

Associate Administrator
Office of Education

APPENDIX A.1

Instructions for Responding to NASA Research Announcements (1852.235-72, OCTOBER 2002)

(a) **General.**

(1) Proposals received in response to a NASA Research Announcement (NRA) will be used only for evaluation purposes. NASA does not allow a proposal, the contents of which are not available without restriction from another source, or any unique ideas submitted in response to an NRA to be used as the basis of a solicitation or in negotiation with other organizations, nor is a pre-award synopsis published for individual proposals.

(2) A solicited proposal that results in a NASA award becomes part of the record of that transaction and may be available to the public on specific request; however, information or material that NASA and the awardee mutually agree to be of a privileged nature will be held in confidence to the extent permitted by law, including the Freedom of Information Act.

(3) NRAs contain programmatic information and certain requirements that apply only to proposals prepared in response to that particular announcement. These instructions contain the general proposal preparation information that applies to responses to all NRAs.

(4) A contract, grant, cooperative agreement, or other agreement may be used to accomplish an effort funded in response to an NRA. The NASA contracting officer will determine the appropriate award instrument. Contracts resulting from NRAs are subject to the Federal Acquisition Regulation and the NASA FAR Supplement. Any resultant grants or cooperative agreements will be awarded and administered in accordance with the NASA Grant and Cooperative Agreement Handbook (NPG 5800.1).

(5) NASA does not have mandatory forms or formats for responses to NRAs; however, it is requested that proposals conform to the guidelines in these instructions. NASA may accept proposals without discussion; hence, proposals should initially be as complete as possible and be submitted on the proposers' most favorable terms.

(6) To be considered for award, a submission must, at a minimum, present a specific project within the areas delineated by the NRA; contain sufficient technical and cost information to permit a meaningful evaluation; be signed by an official authorized to legally bind the submitting organization; not merely offer to perform standard services or to just provide computer facilities or services; and not significantly duplicate a more specific current or pending NASA solicitation.

(b) **NRA-Specific Items.** Several proposal submission items appear in the NRA itself: the unique NRA identifier; when to submit proposals; where to send proposals; number of copies required; and sources for more information. Items included in these instructions may be supplemented by the NRA.

(c) The following information is needed to permit consideration in an objective manner. NRAs will generally specify topics for which additional information or greater detail is desirable. Each proposal copy shall contain all submitted material, including a copy of the transmittal letter if it contains substantive information.

(1) **Transmittal Letter or Prefatory Material.**

(i) The legal name and address of the organization and specific division or campus identification if part of a larger organization;

(ii) A brief, scientifically valid project title intelligible to a scientifically literate reader and suitable for use in the public press;

- (iii) Type of organization: e.g., profit, nonprofit, educational, small business, minority, women-owned, etc.;
- (iv) Name and telephone number of the principal investigator and business personnel who may be contacted during evaluation or negotiation;
- (v) Identification of other organizations that are currently evaluating a proposal for the same efforts;
- (vi) Identification of the NRA, by number and title, to which the proposal is responding;
- (vii) Dollar amount requested, desired starting date, and duration of project;
- (viii) Date of submission; and
- (ix) Signature of a responsible official or authorized representative of the organization, or any other person authorized to legally bind the organization (unless the signature appears on the proposal itself).

(2) Restriction on Use and Disclosure of Proposal Information. Information contained in proposals is used for evaluation purposes only. Offerors or quoters should, in order to maximize protection of trade secrets or other information that is confidential or privileged, place the following notice on the title page of the proposal and specify the information subject to the notice by inserting an appropriate identification in the notice. In any event, information contained in proposals will be protected to the extent permitted by law, but NASA assumes no liability for use and disclosure of information not made subject to the notice.

Notice

Restriction on Use and Disclosure of Proposal Information

The information (data) contained in [insert page numbers or other identification] of this proposal constitutes a trade secret and/or information that is commercial or financial and confidential or privileged. It is furnished to the Government in confidence with the understanding that it will not, without permission of the offeror, be used or disclosed other than for evaluation purposes; provided, however, that in the event a contract (or other agreement) is awarded on the basis of this proposal the Government shall have the right to use and disclose this information (data) to the extent provided in the contract (or other agreement). This restriction does not limit the Government's right to use or disclose this information (data) if obtained from another source without restriction.

(3) Abstract. Include a concise (200-300 word if not otherwise specified in the NRA) abstract describing the objective and the method of approach.

(4) Project Description.

(i) The main body of the proposal shall be a detailed statement of the work to be undertaken and should include objectives and expected significance; relation to the present state of knowledge; and relation to previous work done on the project and to related work in progress elsewhere. The statement should outline the plan of work, including the broad design of experiments to be undertaken and a description of experimental methods and procedures. The project description should address the evaluation factors in these instructions and any specific factors in the NRA. Any substantial collaboration with individuals not referred to in the budget or use of consultants should be described. Subcontracting significant portions of a research project is discouraged.

(ii) When it is expected that the effort will require more than one year, the proposal should cover the complete project to the extent that it can be reasonably anticipated. Principal emphasis should be on the first year of work, and the description should distinguish clearly between the first year's work and work planned for subsequent years.

(5) Management Approach. For large or complex efforts involving interactions among numerous individuals or other organizations, plans for distribution of responsibilities and arrangements for ensuring a coordinated effort should be described.

(6) Personnel. The principal investigator is responsible for supervision of the work and participates in the conduct of the research regardless of whether or not compensated under the award. A short biographical sketch of the principal investigator, a list of principal publications and any exceptional qualifications should be included. Omit social security number and other personal items, which do not merit consideration in evaluation of the proposal. Give similar biographical information on other senior professional personnel who will be directly associated with the project. Give the names and titles of any other scientists and technical personnel associated substantially with the project in an advisory capacity. Universities should list the approximate number of students or other assistants, together with information as to their level of academic attainment. Any special industry-university cooperative arrangements should be described.

(7) Facilities and Equipment.

(i) Describe available facilities and major items of equipment especially adapted or suited to the proposed project, and any additional major equipment that will be required. Identify any Government-owned facilities, industrial plant equipment, or special tooling that are proposed for use. Include evidence of its availability and the cognizant Government points of contact.

(ii) Before requesting a major item of capital equipment, the proposer should determine if sharing or loan of equipment already within the organization is a feasible alternative. Where such arrangements cannot be made, the proposal should so state. The need for items that typically can be used for research and non-research purposes should be explained.

(8) Proposed Costs (U.S. Proposals Only).

(i) Proposals should contain cost and technical parts in one volume: do not use separate "confidential" salary pages. As applicable, include separate cost estimates for salaries and wages; fringe benefits; equipment; expendable materials and supplies; services; domestic and foreign travel; ADP expenses; publication or page charges; consultants; subcontracts; other miscellaneous identifiable direct costs; and indirect costs. List salaries and wages in appropriate organizational categories (e.g., principal investigator, other scientific and engineering professionals, graduate students, research assistants, and technicians and other non-professional personnel). Estimate all staffing data in terms of staff-months or fractions of full-time.

(ii) Explanatory notes should accompany the cost proposal to provide identification and estimated cost of major capital equipment items to be acquired; purpose and estimated number and lengths of trips planned; basis for indirect cost computation (including date of most recent negotiation and cognizant agency); and clarification of other items in the cost proposal that are not self-evident. List estimated expenses as yearly requirements by major work phases.

(iii) Allowable costs are governed by [FAR Part 31](#) and the [NASA FAR Supplement Part 1831](#) (and OMB Circulars A-21 for educational institutions and A-122 for nonprofit organizations). All proposals involving NASA employees as either PI or as a CO-I must be shown in full cost in accordance with Agency full cost accounting standards (www.hq.nasa.gov/fullcost).

(iv) Use of NASA funds--NASA funding may not be used for foreign research efforts at any level, whether as a collaborator or a subcontract (also see paragraph I). The direct purchase

of supplies and/or services, which do not constitute research, from non-U.S. sources by U.S. award recipients is permitted. Additionally, in accordance with the National Space Transportation Policy, use of a non-U.S. manufactured launch vehicle is permitted only on a no-exchange-of-funds basis.

(9) **Security.** Proposals should not contain security-classified material. If the research requires access to or may generate security-classified information, the submitter will be required to comply with Government security regulations.

(10) **Current Support.** For other current projects being conducted by the principal investigator, provide title of project, sponsoring agency, and ending date.

(11) **Special Matters.**

(i) Include any required statements of environmental impact of the research, human subject or animal care provisions, conflict of interest, or on such other topics as may be required by the nature of the effort and current statutes, executive orders, or other current Government-wide guidelines. Of particular interest are proposed use of radioactive or hazardous materials or lasers.

(ii) Identify and discuss risk factors and issues throughout the proposal where they are relevant, and your approach to managing these risks.

(iii) Proposers should include a brief description of the organization, its facilities, and previous work experience in the field of the proposal. Identify the cognizant Government audit agency, inspection agency, and administrative contracting officer, when applicable.

(d) **Renewal Proposals.**

(1) Renewal proposals for existing awards will be considered in the same manner as proposals for new endeavors. A renewal proposal should not repeat all of the information that was in the original proposal. The renewal proposal should refer to its predecessor, update the parts that are no longer current, and indicate what elements of the research are expected to be covered during the period for which support is desired. A description of any significant findings since the most recent progress report should be included. The renewal proposal should treat, in reasonable detail, the plans for the next period, contain a cost estimate, and otherwise adhere to these instructions.

(2) NASA may renew an effort either through amendment of an existing contract or by a new award.

(e) **Length.** (Omitted; See Appendix A.2).

(f) **Joint Proposals.**

(1) Where multiple organizations are involved, the proposal may be submitted by only one of them. It should clearly describe the role to be played by the other organizations and indicate the legal and managerial arrangements contemplated. In other instances, simultaneous submission of related proposals from each organization might be appropriate, in which case parallel awards would be made.

(2) Where a project of a cooperative nature with NASA is contemplated, describe the contributions expected from any participating NASA investigator and agency facilities or equipment, which may be required. The proposal must be confined only to that which the proposing organization can commit itself. "Joint" proposals, which specify the internal arrangements NASA will actually make, are not acceptable as a means of establishing an agency commitment.

(g) **Late Proposals.** Proposals or proposal modifications received after the latest date specified for receipt may be considered if a significant reduction in cost to the Government is probable or if there are significant technical advantages, as compared with proposals previously received.

(h) **Withdrawal.** Proposals may be withdrawn by the proposer at any time before award. Offerors are requested to notify NASA if the proposal is funded by another organization or of other changed circumstances, which dictate termination of evaluation.

(i) **Evaluation Factors.**

(1) Unless otherwise specified in the NRA, the principal elements (of approximately equal weight) considered in evaluating a proposal are its relevance to NASA's objectives, intrinsic merit, and cost.

(2) Evaluation of a proposal's relevance to NASA's objectives includes the consideration of the potential contribution of the effort to NASA's mission.

(3) Evaluation of its intrinsic merit includes the consideration of the following factors of equal importance:

(i) Overall scientific or technical merit of the proposal or unique and innovative methods, approaches, or concepts demonstrated by the proposal.

(ii) Offeror's capabilities, related experience, facilities, techniques, or unique combinations of these, which are integral factors for achieving the proposal objectives.

(iii) The qualifications, capabilities, and experience of the proposed principal investigator, team leader, or key personnel critical in achieving the proposal objectives.

(iv) Overall standing among similar proposals and/or evaluation against the state-of-the-art.

(4) Evaluation of the cost of a proposed effort may include the realism and reasonableness of the proposed cost and available funds. Cost is of substantially less weight than the other factors combined.

(j) **Evaluation Techniques.** Selection decisions will be made following peer and/or scientific review of the proposals. Several evaluation techniques are regularly used within NASA. In all cases proposals are subject to scientific review by discipline specialists in the area of the proposal. Some proposals are reviewed entirely in-house, others are evaluated by a combination of in-house and selected external reviewers, while yet others are subject to the full external peer review technique (with due regard for conflict-of-interest and protection of proposal information), such as by mail or through assembled panels. The final decisions are made by a NASA selecting official. A proposal, which is scientifically and programmatically meritorious, but not selected for award during its initial review, may be included in subsequent reviews unless the proposer requests otherwise.

(k) **Selection for Award.**

(1) When a proposal is not selected for award, the proposer will be notified. NASA will explain generally why the proposal was not selected. Proposers desiring additional information may contact the selecting official who will arrange a debriefing.

(2) When a proposal is selected for award, negotiation and award will be handled by the procurement office in the funding installation. The proposal is used as the basis for negotiation. The contracting officer may request certain business data and may forward a model award instrument and other information pertinent to negotiation.

(l) Additional Guidelines Applicable to Foreign Proposals and Proposals Including Foreign Participation.

(1) NASA welcomes proposals from outside the U.S. However, foreign entities are generally not eligible for funding from NASA. Therefore, unless otherwise noted in the NRA, proposals from foreign entities should not include a cost plan unless the proposal involves collaboration with a U.S. institution, in which case a cost plan for only the participation of the U.S. entity must be included. Proposals from foreign entities and proposals from U.S. entities that include foreign participation must be endorsed by the respective government agency or funding/sponsoring institution in the country from which the foreign entity is proposing. Such endorsement should indicate that the proposal merits careful consideration by NASA, and if the proposal is selected, sufficient funds will be made available to undertake the activity as proposed.

(2) All foreign proposals must be typewritten in English and comply with all other submission requirements stated in the NRA. All foreign proposals will undergo the same evaluation and selection process as those originating in the U.S. All proposals must be received before the established closing date. Those received after the closing date will be treated in accordance with paragraph (g) of this provision. Sponsoring foreign government agencies or funding institutions may, in exceptional situations, forward a proposal without endorsement if endorsement is not possible before the announced closing date. In such cases, the NASA sponsoring office should be advised when a decision on endorsement can be expected.

(3) Successful and unsuccessful foreign entities will be contacted directly by the NASA sponsoring office. Copies of these letters will be sent to the foreign sponsor. Should a foreign proposal or a U.S. proposal with foreign participation be selected, NASA's Office of External Relations will arrange with the foreign sponsor for the proposed participation on a no-exchange-of-funds basis, in which NASA and the non-U.S. sponsoring agency or funding institution will each bear the cost of discharging their respective responsibilities.

(4) Depending on the nature and extent of the proposed cooperation, these arrangements may entail:

- (i) An exchange of letters between NASA and the foreign sponsor; or
- (ii) A formal Agency-to-Agency Memorandum of Understanding (MOU).

(m) Cancellation of NRA. NASA reserves the right to make no awards under this NRA and to cancel this NRA. NASA assumes no liability for canceling the NRA or for anyone's failure to receive actual notice of cancellation.

APPENDIX A.2

Additional Instructions for Responding to NN-H-04-Z-YO-006-N

Length and Page Format. Unless otherwise specified in the NRA, effort should be made to keep proposals as brief as possible, concentrating on substantive material. **Proposals are not to exceed 20 pages**, including tables, figures and references (cover pages, abstract, certifications, budget sheets, biographical sketches of key personnel, summary of facilities and equipment, and attachments are not included in this page limit). Necessary detailed information, such as reprints, should be included as attachments. A complete set of attachments is necessary for each copy of the proposal. As proposals are not returned, avoid use of "one-of-a-kind" attachments.

Export Control Guidelines Applicable to Proposals Including Foreign Participation.

Proposals including foreign participation must include a section discussing compliance with U.S. export laws and regulations, e.g., 22 CFR Parts 120-130 and 15 CFR Parts 730-774, as applicable to the circumstances surrounding the particular foreign participation. The discussion must describe in detail the proposed foreign participation and is to include, but not limited to, whether or not the foreign participation may require the prospective proposer to obtain the prior approval of the Department of State or the Department of Commerce via a technical assistance agreement or an export license, or whether a license exemption/exception may apply. If prior approvals via licenses are necessary, discuss whether the license has been applied for or if not, the projected timing of the application and any implications for the schedule. Information regarding U.S. export regulations is available at <http://www.pmdtc.org> and <http://www.bxa.doc.gov>. Proposers are advised that under U.S. law and regulations, spacecraft and their specifically designed, modified, or configured systems, components, and parts are generally considered "Defense Articles" on the United States Munitions List and subject to the provisions of the International Traffic in Arms Regulations (ITAR), 22 CFR Parts 120-130.

Data Policy. NASA's policy is to work cooperatively with other U.S. government agencies and our international partners in the development of a comprehensive capability to observe and understand the Earth. In addition, both National and NASA policy require NASA to support private-sector investment in commercial space activities by committing the U.S. government to purchase commercially available goods and services. NASA will not develop a mission that in any significant way competes with or duplicates commercially available goods or services from U.S. industry.

APPENDIX B

Required Proposal Cover Page

Two steps are required to submit a cover page. The first step is to complete the proposal cover page (see SAMPLE Appendix C) **electronically** to the SYS-EYFUS Website located at <http://proposals.hq.nasa.gov>. If the proposer has submitted an electronic Notice of Intent (Appendix F) to SYS-EYFUS, the same user UserID and password can be used to complete the electronic proposal cover page. If the proposer obtained a User ID and password in the process of submitting a proposal for a previous research opportunity announcement, the same user UserID and password can be used to complete the electronic proposal cover page in response to this research opportunity announcement. Be sure to click on "Edit Personal Information" if any of your correspondence information in SYS-EYFUS is not current.

The second step is to print a **hard copy** (see Appendix D) of the electronic cover page that must be signed by the Principal Investigator and an official of the investigator's organization who is authorized to commit the organization. This authorizing signature also certifies that the proposing institution has read and is in compliance with the required certifications printed in full, therefore, these certifications do not need to be submitted separately. This page will not be counted against the page limit of the proposal.

If you do not have a SYS-EYFUS UserID or password, you may obtain one electronically by going to <http://proposals.hq.nasa.gov> and performing the following steps:

- I. Click the hyperlink for **new user** that will take you to the Personal Information Search Page.
- II. Enter your first and last name. SYS-EYFUS will **search** for your record information in the SYS-EYFUS database.
- III. Confirm your personal information by **choosing** the record displayed.
- IV. Select **continue**, and a User ID and password will be e-mailed to you.

Once you receive your User ID and Password, **login** to the SYS-EYFUS website and follow the instructions for **New Proposal Cover Page**.

Proposers without access to the web or who experience difficulty in using this site may contact the Help Desk at proposals@hq.nasa.gov (or call 202-479-9376) for assistance. After you have submitted your notice of intent or proposal cover page electronically, if you are unsure if it has been successfully submitted, **do not re-submit**. Please call the Help Desk. They will be able to promptly tell you if your submission has been received. Please note that submission of the electronic cover page does not satisfy the deadline for proposal submission.

APPENDIX C



Proposal Cover Page

Proposal Number: _____

Date: ____/____/____

Name of Submitting Institution: _____

Congressional District: _____

Proposal Title: _____

Name of Submitting Institution: _____

Congressional District: _____

Certification of Compliance with Applicable Executive Orders and US Code

By submitting the proposal identified in this *Cover Sheet/Proposal Summary* in response to this Research Announcement, the Authorizing Official of the proposing institution (or the individual proposer if there is no proposing institution) as identified below:

- certifies that the statements made in this proposal are true and complete to the best of his/her knowledge;
- agrees to accept the obligations to comply with NASA award terms and conditions if an award is made as a result of this proposal; and
- confirms compliance with all provisions, rules, and stipulations set forth in the two Certifications contained in this NRA [namely, (i) *Assurance of Compliance with the NASA Regulations Pursuant to Nondiscrimination in Federally Assisted Programs*, and (ii) *Certifications, Disclosures, And Assurances Regarding Lobbying and Debarment & Suspension*].

Willful provision of false information in this proposal and/or its supporting documents, or in reports required under an ensuing award, is a criminal offense (U.S. Code, Title 18, Section 1001).

NASA PROCEDURE FOR HANDLING PROPOSALS

This proposal shall be used and disclosed for evaluation purposes only, and a copy of this Government notice shall be applied to any reproduction or abstract thereof. Any authorized restrictive notices that the submitter places on this proposal shall also be strictly complied with. Disclosure of this proposal for any reason outside the Government evaluation purposes shall be made only to the extent authorized by the Government.

Principal Investigator Name:	Authorized Institutional Official Name:
Organization:	Organization:
Department:	Department:
Mailing Address:	Address:
City, State Zip:	City State Zip:
Telephone Number:	Telephone Number:
Fax Number:	Fax Number:
Email Address:	Email Address:
Principal Investigator Signature:	Authorized Institutional Official Signature:
Date:	Date:

Co-Investigator:	Name	Telephone	Email	Institution	Address

Budget:		Budget
Year		
1		
2		
3		
Total		

Check the appropriate category(ies):

Increasing K-12 Educator Support for Teaching Earth Science and Geography

☐

Strengthening Undergraduate Institutional Capacity in Earth System Science and Applications

☐

Enriching Public Scientific Literacy about the Earth System and the Environment

☐

APPENDIX D

Assurance of Compliance with the NASA Regulations Pursuant to Nondiscrimination in Federally Assisted Programs

The *(Institution, corporation, firm, or other organization on whose behalf this assurance is signed, hereinafter called "Applicant ")* hereby agrees that it will comply with Title VI of the Civil Rights Act of 1964 (P.L. 88-352), Title IX of the Education Amendments of 1972 (20 U.S.C. 1680 et seq.), Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), and the Age Discrimination Act of 1975 (42 U.S.C. 16101 et seq.), and all requirements imposed by or pursuant to the Regulation of the National Aeronautics and Space Administration (14 CFR Part 1250) (hereinafter called "NASA") issued pursuant to these laws, to the end that in accordance with these laws and regulations, no person in the United States shall, on the basis of race, color, national origin, sex, handicapped condition, or age be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity for which the Applicant receives federal financial assistance from NASA; and hereby give assurance that it will immediately take any measure necessary to effectuate this agreement.

If any real property or structure thereon is provided or improved with the aid of federal financial assistance extended to the Applicant by NASA, this assurance shall obligate the Applicant, or in the case of any transfer of such property, any transferee, for the period during which the real property or structure is used for a purpose for which the federal financial assistance is extended or for another purpose involving the provision of similar services or benefits. If any personal property is so provided, this assurance shall obligate the Applicant for the period during which it retains ownership or possession of the property. In all other cases, this assurance shall obligate the Applicant for the period during which the federal financial assistance is extended to it by NASA.

This assurance is given in consideration of and for the purpose of obtaining any and all federal grants, loans, contracts, property, discounts, or other federal financial assistance extended after the date hereof to the Applicant by NASA, including installment payments after such date on account of applications for federal financial assistance which were approved before such date. The Applicant recognizes and agrees that such federal financial assistance will be extended in reliance on the representations and agreements made in this assurance, and that the United States shall have the right to seek judicial enforcement of this assurance. This assurance is binding on the Applicant, its successors, transferees, and assignees, and the person or persons whose signatures appear on the Proposal Cover Sheet above are authorized to sign on behalf of the Applicant.

CERTIFICATIONS, DISCLOSURES, AND ASSURANCES REGARDING LOBBYING AND DEBARMENT & SUSPENSION

1. LOBBYING

As required by Section 1352, Title 31 of the U.S. Code, and implemented at 14 CFR Part 1271, as defined at 14 CFR Subparts 1271.110 and 1260.117, with each submission that initiates agency consideration of such applicant for award of a Federal contract, grant, or cooperative agreement exceeding \$ 100,000, the applicant must **certify** that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit a Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

2. GOVERNMENTWIDE DEBARMENT AND SUSPENSION

As required by Executive Order 12549, and implemented at 14 CFR 1260.510, for prospective participants in primary covered transactions, as defined at 14 CFR Subparts 1265.510 and 1260.117—

(1) The prospective primary participant **certifies** to the best of its knowledge and belief, that it and its principals:

(a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded by any Federal department or agency;

(b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and

(d) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

(2) Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

APPENDIX E **BUDGET SUMMARY**

For period from _____ to _____

- Provide a complete Budget Summary for year one and separate estimated for each subsequent year.
- Enter the proposed estimated costs in Column A (Columns B & C for NASA use only).
- Provide as attachments detailed computations of all estimates in each cost category with narratives as required to fully explain each proposed cost. See *Instructions For Budget Summary* on following page for details.

		<u> NASA USE ONLY </u>	
	A	B	C
1. <u>Direct Labor</u> (salaries, wages, and fringe benefits)	_____	_____	_____
2. <u>Other Direct Costs</u> :			
a. Subcontracts	_____	_____	_____
b. Consultants	_____	_____	_____
c. Equipment	_____	_____	_____
d. Supplies	_____	_____	_____
e. Travel	_____	_____	_____
f. Other	_____	_____	_____
3. <u>Indirect Costs*</u>	_____	_____	_____
4. <u>Other Applicable Costs</u>	_____	_____	_____
5. <u>SUBTOTAL--Estimated Costs</u>	_____	_____	_____
6. <u>Less Proposed Cost Sharing</u> (if any)	_____	_____	_____
7. <u>Carryover Funds</u> (if any)			
a. Anticipated amount : _____			
b. Amount used to reduce budget	_____	_____	_____
8. <u>Total Estimated Costs</u>	_____	_____	XXXXXXXX
9. APPROVED BUDGET	XXXXXXX	XXXXXXX	_____

***Facilities and Administrative Costs.**

INSTRUCTIONS FOR BUDGET SUMMARY

1. Direct Labor (salaries, wages, and fringe benefits): Attachments should list the number and titles of personnel, amounts of time to be devoted to the grant, and rates of pay.
2. Other Direct Costs:
 - a. Subcontracts: Attachments should describe the work to be subcontracted, estimated amount, recipient (if known), and the reason for subcontracting.
 - b. Consultants: Identify consultants to be used, why they are necessary, the time they will spend on the project, and rates of pay (not to exceed the equivalent of the daily rate for Level IV of the Executive Schedule, exclusive of expenses and indirect costs).
 - c. Equipment: List separately. Explain the need for items costing more than \$5,000. Describe basis for estimated cost. General purpose equipment is not allowable as a direct cost unless specifically approved by the NASA Grant Officer. Any equipment purchase requested to be made as a direct charge under this award must include the equipment description, how it will be used in the conduct of the basic research proposed and why it cannot be purchased with indirect funds.
 - d. Supplies: Provide general categories of needed supplies, the method of acquisition, and the estimated cost.
 - e. Travel: Describe the purpose of the proposed travel in relation to the grant and provide the basis of estimate, including information on destination and number of travelers where known.
 - f. Other: Enter the total of direct costs not covered by 2a through 2e. Attach an itemized list explaining the need for each item and the basis for the estimate.
3. Indirect Costs*: Identify F&A cost rate(s) and base(s) as approved by the cognizant Federal agency, including the effective period of the rate. Provide the name, address, and telephone number of the Federal agency official having cognizance. If unapproved rates are used, explain why, and include the computational basis for the indirect expense pool and corresponding allocation base for each rate.
4. Other Applicable Costs: Enter total explaining the need for each item.
5. Subtotal-Estimated Costs: Enter the sum of items 1 through 4.
6. Less Proposed Cost Sharing (if any): Enter any amount proposed. If cost sharing is based on specific cost items, identify each item and amount in an attachment.
7. Carryover Funds (if any): Enter the dollar amount of any funds expected to be available for carryover from the prior budget period. Identify how the funds will be used if they are not used to reduce the budget. NASA officials will decide whether to use all or part of the anticipated carryover to reduce the budget (not applicable to 2nd-year and subsequent-year budgets submitted for award of a multiple year award).
8. Total Estimated Costs: Enter the total after subtracting items 6 and 7b from item 5.

* Facilities and Administrative (F&A) Costs

APPENDIX F

Notice of Intent to Propose

In order to plan for a timely and efficient peer review process, *Notices of Intent* (NOI's) to propose are strongly encouraged by the date given in this NRA. The submission of a NOI is not a commitment to submit a proposal, nor is information contained therein considered binding on the submitter. NOI's are to be submitted electronically by entering the requested information through SYS-EYFUS Web site located at <http://proposals.hq.nasa.gov/>.

User identifications (IDs) and passwords are required by NASA security policies in order to access the SYS-EYFUS Web site.

If the proposer obtained a User ID and password in the process of submitting a proposal for a previous research opportunity announcement, the same user UserID and password can be used to complete the electronic Notice of Intent to Propose in response to this research opportunity announcement.

If you do not have a SYS-EYFUS UserID or password, you may obtain one electronically by going to <http://proposals.hq.nasa.gov> and performing the following steps:

- I. Click the hyperlink for **new user** which will take you to the Personal Information Search Page.
- II. Enter your first and last name. SYS-EYFUS will **search** for your record information in the SYS-EYFUS database.
- III. Confirm your personal information by **choosing** the record displayed.
- IV. Select **continue**, and a User ID and password will be e-mailed to you.

Once you receive your User ID and Password, **login** to the SYS-EYFUS Web site and follow the instructions for **New Notice of Intent**.

At a minimum, the following information will be requested:

- NRA number, alpha-numeric identifier, (Note: this may be included on the Web site template);
- the Principal Investigator's name, mailing address, phone number, and E-mail address;
- the name(s) of any Co-Investigator(s) and institution(s) known by the NOI due date;
- a descriptive title of the intended investigation; and,
- brief description of the investigation to be proposed.

A separate NOI must be submitted for each intended proposal.